IT IS CLAIMED

1. A method for scheduling service of traffic relating to a plurality of different communication flows, each communication flow having a respective service need associated therewith, the method comprising:

determining a first service order for servicing the plurality of communication flows, the first service order being based upon the relative service needs of each of the plurality of communication flows;

detecting a change in the service need of at least one communication flow;

determining a new service need associated with the at least one communication flow; and

automatically determining a second service order for servicing the plurality of communication flows, the second service order being based upon the relative service needs of each of the plurality of communication flows, including the new service need of the at least one communication flow.

2. The method of claim 1 wherein the determining of the first and second service orders is performed dynamically.

3. The method of claim 1 further comprising:

calculating a respective service need indicator value for each of the communication flows, wherein the service need indicator value associated with a selected communication flow is inversely related to a degree of service need associated with the selected communication flow.

4. The method of claim 3 wherein the service need indicator value associated with the selected communication flow corresponds to a bit rate associated with the selected communication flow.

5. The method of claim 3 wherein the service need indicator value associated with the selected communication flow corresponds to a line rate associated with a port associated with the selected communication flow.

6. The method of claim 3 wherein at least one of the service order determining operations includes using the service need indicator values to determine a service order for servicing the plurality of communication flows.

7. The method of claim 3 further comprising:

calculating the service need indicator value (I) associated with the selected communication flow according to: I = RANGE/R;

wherein R corresponds to the degree of service need associated with the selected communication flow; and

wherein RANGE is a value at least equal to a summation of respective degree of service needs associated with each of the communication flows.

8. The method of claim 3 further comprising:

calculating a respective time key value for each of the communication flows;

wherein a least significant bit portion of a time key value associated with the selected communication flow corresponds to the service need indicator value associated with the selected communication; and

wherein at least one of the service order determining operations includes using the time key values to determine a service order for servicing the plurality of communication flows.

9. The method of claim 8 wherein a most significant bit portion of the time key value associated with the selected communication flow corresponds to an integer multiple of the service need indicator value associated with the selected communication flow.

10. The method of claim 14 further comprising:

incrementing a most significant bit portion of the time key value associated with the selected communication flow each time the selected communication flow is serviced.

11. The method of claim 10 wherein said incrementing includes incrementing the most significant bit portion of the time key value associated with the selected communication flow by an amount at least equal to the service need indicator value associated with the selected communication flow.

12. The system of claim 1 wherein the method is performed by a single scheduler configured to service traffic relating to the plurality of different communication flows.

13. A method for scheduling service of traffic relating to a plurality of different communication flows, the plurality of communication flows including a first communication flow having a first service need associated therewith, and a second communication flow having a second service need associated therewith, the method comprising:

dynamically determining a first service order for servicing the first and second communication flows, the first service order being based upon the relative service needs of the first and second communication flows;

detecting a change in the service need associated with the first communication flow;

automatically determining a new service need associated with the first communication flow; and

dynamically determining a second service order for the first and second communication flows, the second service order being based upon the relative service needs of each of the plurality of communication flows, including the new service need of the first communication flow.

14. The method of claim 13 further comprising:

calculating a first service need indicator value associated with the first communication flow, wherein the first service need indicator value is inversely related to a first degree of service need associated with the first communication flow; and

calculating a second service need indicator value associated with the second communication flow, wherein the second service need indicator value is inversely

related to a second degree of service need associated with the second communication flow.

15. The method of claim 14 wherein the first service need indicator value corresponds to a bit rate associated with the first communication flow.

16. The method of claim 14 wherein the first service need indicator value corresponds to a line rate associated with a port associated with the first communication flow.

17. The method of claim 14 wherein at least one of the service order determining operations includes using the first service need indicator value to determine a service order for servicing the plurality of communication flows.

18. The method of claim 14 further comprising:

calculating the first service need indicator value (I) associated with the first communication flow according to: I = RANGE/R;

wherein R corresponds to the first degree of service need associated with the first communication flow; and

wherein RANGE is a value at least equal to a summation of the first and second service need indicator values.

19. The method of claim 14 further comprising:

calculating a first time key value associated with the first communication flow;

wherein a least significant bit portion of the first time key value corresponds to the first service need indicator value;

calculating a second time key value associated with the second communication flow;

wherein a least significant bit portion of the second time key value corresponds to the second service need indicator value; and

wherein at least one of the service order determining operations includes using the first and second time key values to determine a service order for servicing the plurality of communication flows.

20. The method of claim 19 wherein a most significant bit portion of the first time key value corresponds to an integer multiple of the service need indicator value associated with the first communication flow.

21. The method of claim 14 further comprising:

incrementing a most significant bit portion of the first time key value associated with the first communication flow each time a data parcel from the first communication flow is serviced; and

incrementing a most significant bit portion of the second time key value associated with the second communication flow each time a data parcel from the second communication flow is serviced.

22. The method of claim 21 wherein said incrementing includes:

incrementing the most significant bit portion of the first time key value by an amount at least equal to the first service need indicator value; and

incrementing the most significant bit portion of the second time key value by an amount at least equal to the second service need indicator value.

23. A system for scheduling service of traffic relating to a plurality of different communication flows, each communication flow having a respective service need associated therewith, the system comprising:

at least one processor;

memory; and

at least one interface configured or designed to provide a communication link to at least one network device in a data network;

the system being configured or designed to determine a first service order for servicing the plurality of communication flows, the first service order being based upon the relative service needs of each of the plurality of communication flows;

the system being further configured or designed to detect a change in the service need of at least one communication flow;

the system being further configured or designed to determine a new service need associated with the at least one communication flow; and

the system being further configured or designed to automatically determine a second service order for servicing the plurality of communication flows, the second service order being based upon the relative service needs of each of the plurality of communication flows, including the new service need of the at least one communication flow.

24. The system of claim 23 wherein the determine of the first and second service orders is performed dynamically.

25. The system of claim 23 being further configured or designed to calculate a respective service need indicator value for each of the communication flows, wherein the service need indicator value associated with a selected communication flow is inversely related to a degree of service need associated with the selected communication flow.

26. The system of claim 25 wherein the service need indicator value associated with the selected communication flow corresponds to a bit rate associated with the selected communication flow.

27. The system of claim 25 wherein the service need indicator value associated with the selected communication flow corresponds to a line rate associated with a port associated with the selected communication flow.

28. The system of claim 25 being further configured or designed to use the service need indicator values to determine a service order for servicing the plurality of communication flows.

29. The system of claim 25 being further configured or designed to calculate the service need indicator value (I) associated with the selected communication flow according to: I = RANGE/R;

wherein R corresponds to the degree of service need associated with the selected communication flow; and

wherein RANGE is a value at least equal to a summation of respective degree of service needs associated with each of the communication flows.

30. The system of claim 25 being further configured or designed to calculate a respective time key value for each of the communication flows;

wherein a least significant bit portion of a time key value associated with the selected communication flow corresponds to the service need indicator value associated with the selected communication; and

the system being further configured or designed to use the time key values to determine a service order for servicing the plurality of communication flows.

31. The system of claim 30 wherein a most significant bit portion of the time key value associated with the selected communication flow corresponds to an integer multiple of the service need indicator value associated with the selected communication flow.

32. The system of claim 14 being further configured or designed to increment a most significant bit portion of the time key value associated with the selected communication flow each time the selected communication flow is serviced.

33. The system of claim 30 being further configured or designed to increment the most significant bit portion of the time key value associated with the selected communication flow by an amount at least equal to the service need indicator value associated with the selected communication flow.

34. The system of claim 23 wherein the system comprises a single scheduler for servicing traffic relating to the plurality of different communication flows.

35. A computer program product for scheduling service of traffic relating to a plurality of different communication flows, each communication flow having a respective service need associated therewith, the computer program product comprising:

a computer usable medium having computer readable code embodied therein, the computer readable code comprising:

computer code for determining a first service order for servicing the plurality of communication flows, the first service order being based upon the relative service needs of each of the plurality of communication flows;

computer code for detecting a change in the service need of at least one communication flow;

computer code for determining a new service need associated with the at least one communication flow; and

computer code for automatically determining a second service order for servicing the plurality of communication flows, the second service order being based upon the relative service needs of each of the plurality of communication flows, including the new service need of the at least one communication flow.

36. The computer program product of claim 35 wherein the determining of the first and second service orders is performed dynamically.

37. The computer program product of claim 35 further comprising:

computer code for calculating a respective service need indicator value for each of the communication flows, wherein the service need indicator value associated with a selected communication flow is inversely related to a degree of service need associated with the selected communication flow.

38. The computer program product of claim 37 wherein the service need indicator value associated with the selected communication flow corresponds to a bit rate associated with the selected communication flow.

39. The computer program product of claim 37 wherein the service need indicator value associated with the selected communication flow corresponds to a line rate associated with a port associated with the selected communication flow.

40. The computer program product of claim 37 further including computer code for using the service need indicator values to determine a service order for servicing the plurality of communication flows.

41. The computer program product of claim 37 further comprising:

computer code for calculating the service need indicator value (I) associated with the selected communication flow according to: I = RANGE/R;

wherein R corresponds to the degree of service need associated with the selected communication flow; and

wherein RANGE is a value at least equal to a summation of respective degree of service needs associated with each of the communication flows.

42. The computer program product of claim 37 further comprising:

computer code for calculating a respective time key value for each of the communication flows;

wherein a least significant bit portion of a time key value associated with the selected communication flow corresponds to the service need indicator value associated with the selected communication; and

wherein the computer program product further includes computer code for using the time key values to determine a service order for servicing the plurality of communication flows.

43. The computer program product of claim 42 wherein a most significant bit portion of the time key value associated with the selected communication flow corresponds to an integer multiple of the service need indicator value associated with the selected communication flow.

44. The computer program product of claim 14 further comprising:

computer code for incrementing a most significant bit portion of the time key value associated with the selected communication flow each time the selected communication flow is serviced.

45. The computer program product of claim 44 wherein said incrementing code includes computer code for incrementing the most significant bit portion of the time key value associated with the selected communication flow by an amount at least equal to the service need indicator value associated with the selected communication flow.

46. A system for scheduling service of traffic relating to a plurality of different communication flows, each communication flow having a respective service need associated therewith, the system comprising:

means for determining a first service order for servicing the plurality of communication flows, the first service order being based upon the relative service needs of each of the plurality of communication flows;

means for detecting a change in the service need of at least one communication flow;

means for determining a new service need associated with the at least one communication flow; and

means for automatically determining a second service order for servicing the plurality of communication flows, the second service order being based upon the relative service needs of each of the plurality of communication flows, including the new service need of the at least one communication flow.

47. The system of claim 46 wherein the determining of the first and second service orders is performed dynamically.

48. The system of claim 46 further comprising:

means for calculating a respective service need indicator value for each of the communication flows, wherein the service need indicator value associated with a

selected communication flow is inversely related to a degree of service need associated with the selected communication flow.

49. The system of claim 48 wherein the service need indicator value associated with the selected communication flow corresponds to a bit rate associated with the selected communication flow.

50. The system of claim 48 wherein the service need indicator value associated with the selected communication flow corresponds to a line rate associated with a port associated with the selected communication flow.

51. The system of claim 48 further including means for using the service need indicator values to determine a service order for servicing the plurality of communication flows.

52. The system of claim 48 further comprising:

means for calculating the service need indicator value (I) associated with the selected communication flow according to: I = RANGE/R;

wherein R corresponds to the degree of service need associated with the selected communication flow; and

wherein RANGE is a value at least equal to a summation of respective degree of service needs associated with each of the communication flows.

53. The system of claim 48 further comprising:

means for calculating a respective time key value for each of the communication flows;

wherein a least significant bit portion of a time key value associated with the selected communication flow corresponds to the service need indicator value associated with the selected communication; and

wherein the system further includes means for using the time key values to determine a service order for servicing the plurality of communication flows.

54. The system of claim 53 wherein a most significant bit portion of the time key value associated with the selected communication flow corresponds to an integer multiple of the service need indicator value associated with the selected communication flow.

55. The system of claim 14 further comprising:

means for incrementing a most significant bit portion of the time key value associated with the selected communication flow each time the selected communication flow is serviced.

56. The system of claim 55 wherein said incrementing code includes means for incrementing the most significant bit portion of the time key value associated with the selected communication flow by an amount at least equal to the service need indicator value associated with the selected communication flow.